

Claims

1. A method for measuring jitter in a digital input
5 signal, the method comprising:
producing a digital reference signal having a
predetermined frequency offset from that of
said digital input signal;
10 detecting a first occurrence of a predetermined
phase relationship between said digital input
signal and said digital reference signal;
detecting subsequent occurrence of said
predetermined phase relationship between said
15 digital input signal and said digital reference
signal; and
determining the time difference between said first
occurrence and said subsequent occurrence, to
determine a measurement of jitter present in
20 said digital input signal.
2. The method of claim 1 wherein the step of producing
said digital reference signal comprises:
measuring the frequency of said digital input signal
to produce a frequency measurement; and
25 using the frequency measurement to produce said
digital reference signal having a frequency
which is offset therefrom by a predetermined
amount.
- 30 3. The method of claim 1 wherein the step of detecting
a first occurrence of a predetermined phase relationship
between said digital input signal and said digital

reference signal and the step of detecting subsequent occurrence of said predetermined phase relationship between said digital input signal and said digital reference signal comprise detecting coincidence of similar edges of said digital input signal and said digital reference signal.

4. The method of claim 1 wherein the step of detecting subsequent occurrence of said predetermined phase relationship between said digital input signal and said digital reference signal comprises:
detecting over a plurality of said subsequent occurrences a maximum time difference value and a minimum time difference value; and
determining from said maximum time difference value and said minimum time difference value a total peak-to-peak jitter measurement.
5. The method of claim 4 wherein said predetermined frequency offset is varied between test cycles to facilitate detection of fixed frequency jitter based on a frequency that would beat with a fixed frequency offset.
6. The method of claim 1 further comprising pre-scaling the digital input signal to increase the resolution of jitter measurement.

7. An apparatus for measuring jitter in a digital input signal, the apparatus comprising:

a receiving arrangement for receiving a digital input signal;

5 a reference signal arrangement for producing a digital reference signal having a predetermined frequency offset from that of said digital input signal;

a phase detecting arrangement for detecting a first
10 occurrence of a predetermined phase relationship between said digital input signal and said digital reference signal and subsequent occurrence of said predetermined phase relationship between said digital input
15 signal and said digital reference signal; and

a determining arrangement for determining the time difference between said first occurrence and said subsequent occurrence, to determine a measurement of jitter present in said digital
20 input signal.

8. The apparatus of claim 7 wherein said reference signal arrangement comprises:

a measuring arrangement for measuring the frequency
25 of said digital input signal to produce a frequency measurement; and

a signal producing arrangement for producing from said frequency measurement said digital reference signal having a frequency which is
30 offset therefrom by a predetermined amount.

9. The apparatus of claim 8 wherein said measuring arrangement comprises a frequency counter.

10. The apparatus of claim 8 wherein said signal
5 producing arrangement comprises a programmable oscillator.

11. The apparatus of claim 7 wherein said phase
detecting arrangement comprises an edge detecting
10 arrangement for detecting coincidence of similar edges of said digital input signal and said digital reference signal.

12. The apparatus of claim 7 wherein said phase
15 detecting arrangement comprises:
a minimum/maximum detecting arrangement for
detecting over a plurality of said subsequent
occurrences a maximum time difference value and
a minimum time difference value; and
20 a jitter determining arrangement for determining
from said maximum time difference value and
said minimum time difference value a total
peak-to-peak jitter measurement.

25 13. The apparatus of claim 12 wherein said
minimum/maximum detecting arrangement comprises:
a counter arrangement driven by said reference
signal;
a maximum register arrangement for holding a value
30 in said counter arrangement when said phase
detecting arrangement detects a said second
occurrence;

5 a maximum comparator arrangement for comparing a
value in said maximum register arrangement with
a value in said counter arrangement when said
phase detecting arrangement detects a said
subsequent occurrence and if said counter
arrangement value is greater than said maximum
register arrangement value storing said counter
arrangement value in said maximum register
arrangement;

10 a minimum register arrangement for holding a value
in said counter arrangement when said phase
detecting arrangement detects a said subsequent
occurrence; and

15 a minimum comparator arrangement for comparing a
value in said minimum register arrangement with
a value in said counter arrangement when said
phase detecting arrangement detects a said
second occurrence and if said counter
arrangement value is less than said minimum
20 register arrangement value storing said counter
arrangement value in said minimum register
arrangement.

14. The apparatus of claim 7 wherein the apparatus is
25 substantially comprised in a field programmable gate
array.

15. The apparatus of claim 7 wherein the apparatus is
arranged to sense jitter in a telecommunications pulse
30 code modulation (PCM) signal.

